

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board

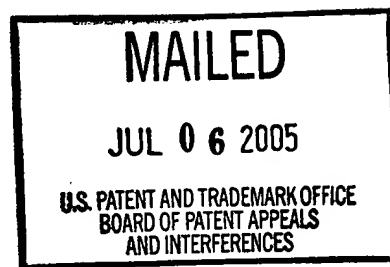
UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte SEBASTIEN RAOUX,
MANDAR MUDHOLKAR and WILLIAM N. TAYLOR

Appeal No. 2005-1114
Application No. 08/988,246

ON BRIEF



Before THOMAS, SMITH, JERRY, and BARRETT, Administrative Patent Judges.

SMITH, JERRY, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on the appeal under 35 U.S.C. § 134 from the examiner's rejection of claims 3-6, 11-14, 16, 19, 20, 23, 24 and 26-30, which constitute all the claims pending in the application.

The disclosed invention pertains to a substrate processing system for use in the fabrication of integrated circuits by chemical vapor deposition (CVD) in a vacuum chamber.

Representative claim 11 is reproduced as follows:

11. A substrate processing system comprising:
 - a deposition chamber comprising a reaction zone;
 - a substrate holder that positions a substrate in the reaction zone;
 - said substrate holder comprising a low frequency (LF) electrode;
 - a gas distribution system that includes a gas inlet manifold for supplying one or more process gases to said reaction zone;
 - said gas inlet manifold comprising a high frequency (HF) electrode;
 - a plasma power source for forming a plasma within the reaction zone of said deposition chamber, the plasma power source comprising a high frequency power supply coupled with the HF electrode and a low frequency power supply coupled with the LF electrode;
 - an impedance monitor comprising a first impedance probe electrically coupled to said high frequency electrode to measure the impedance at the HF electrode and a second impedance probe electrically coupled to said low frequency electrode to measure the impedance at the LF electrode; and
 - a processor coupled with the impedance monitor for adjusting processing conditions of the deposition chamber based on measurements by the first impedance probe and the second impedance probe.

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The examiner relies on the following references:

| | | |
|----------------------------|-----------|-----------------------|
| Boys et al. (Boys) | 4,500,408 | Feb. 19, 1985 |
| Yamagata et al. (Yamagata) | 5,362,358 | Nov. 08, 1994 |
| Patrick et al. (Patrick) | 5,474,648 | Dec. 12, 1995 |
| Arami et al. (Arami) | 6,014,943 | Jan. 18, 2000 |
| | | (filed Sep. 11, 1997) |
| Raoux et al. (Raoux '734) | 6,041,734 | Mar. 28, 2000 |
| Raoux et al. (Raoux '568) | 6,098,568 | Aug. 08, 2000 |

The following rejections are on appeal before us:

1. Claims 3-6, 11-14, 16, 19, 20, 23, 24 and 26-30 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-5 of Raoux '568 in view of Patrick.

2. Claims 3-6, 11-14, 16, 19, 20, 23, 24 and 26-30 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-6 of Raoux '734 in view of Patrick.

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3. Claims 3, 4, 6, 11-14, 16, 19, 20, 24, 26, 28 and 29 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the teachings of Arami in view of Patrick.

4. Claims 5, 27 and 30 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the teachings of Arami in view of Patrick and further in view of Boys.

5. Claim 23 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over the teachings of Arami in view of Patrick and further in view of Yamagata.

Rather than repeat the arguments of appellants or the examiner, we make reference to the briefs and the answer for the respective details thereof.

OPINION

We have carefully considered the subject matter on appeal, the rejections advanced by the examiner and the evidence of obviousness relied upon by the examiner as support for the rejections. We have, likewise, reviewed and taken into consideration, in reaching our decision, the appellants' arguments set forth in the briefs along with the examiner's rationale in support of the rejections and arguments in rebuttal set forth in the examiner's answer.

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It is our view, after consideration of the record before us, that the evidence relied upon and the level of skill in the particular art would not have suggested to one of ordinary skill in the art the obviousness of the invention as set forth in the claims on appeal. Therefore we reverse the examiner's prior art rejections. We note that appellants' main appeal brief acknowledges the examiner's double patenting rejections but offers no rebuttal arguments therein. Appellants filed a terminal disclaimer before the examiner's answer was written, but the record does not reflect acceptance of the terminal disclaimer, and the obviousness-type double patenting rejections were repeated in the examiner's answer. Since the examiner has not withdrawn the obviousness-type double patenting rejections, and since appellants have not challenged these rejections in the appeal briefs, we technically affirm the double patenting rejections on the record in this case. Accordingly, we affirm.

In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the examiner to establish a factual basis to support the legal conclusion of obviousness. See In re Fine, 837 F.2d 1071, 1073, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). In so

doing, the examiner is expected to make the factual determinations set forth in Graham v. John Deere Co., 383 U.S. 1, 17, 148 USPQ 459, 467 (1966), and to provide a reason why one having ordinary skill in the pertinent art would have been led to modify the prior art or to combine prior art references to arrive at the claimed invention. Such reason must stem from some teaching, suggestion or implication in the prior art as a whole or knowledge generally available to one having ordinary skill in the art. Uniroyal, Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 1051, 5 USPQ2d 1434, 1438 (Fed. Cir.), cert. denied, 488 U.S. 825 (1988); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 293, 227 USPQ 657, 664 (Fed. Cir. 1985), cert. denied, 475 U.S. 1017 (1986); ACS Hosp. Sys., Inc. v. Montefiore Hosp., 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). These showings by the examiner are an essential part of complying with the burden of presenting a prima facie case of obviousness. Note In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). If that burden is met, the burden then shifts to the applicant to overcome the prima facie case with argument and/or evidence. Obviousness is then determined on the basis of the evidence as a whole and the relative persuasiveness of the

arguments. See Id.; In re Hedges, 783 F.2d 1038, 1039, 228 USPQ 685, 686 (Fed. Cir. 1986); In re Piasecki, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984); and In re Rinehart, 531 F.2d 1048, 1052, 189 USPQ 143, 147 (CCPA 1976). Only those arguments actually made by appellants have been considered in this decision. Arguments which appellants could have made but chose not to make in the brief have not been considered and are deemed to be waived [see 37 CFR § 41.37(c)(1)(vii)(2004)].

We consider first the rejection of claims 3, 4, 6, 11-14, 16, 19, 20, 24, 26, 28 and 29 as being unpatentable over the teachings of Arami in view of Patrick. With respect to independent claim 11, the examiner essentially finds that Arami teaches the claimed invention except that Arami does not teach an impedance monitor comprising a first impedance probe electrically coupled to the high frequency electrode to measure the impedance at the HF electrode and a second impedance probe electrically coupled to the low frequency electrode to measure the impedance at the LF electrode. The examiner cites Patrick as teaching an impedance monitor having a first impedance probe for measuring the impedance at an electrode. The examiner finds that it would have been obvious to the artisan to use the Patrick impedance

monitor coupled to each of the low and high frequency electrodes of Arami [final rejection, pages 5-7; incorporated into answer at page 4].

With respect to independent claim 11, appellants argue that Patrick fails to disclose even one, much less two, impedance probes for measuring the impedance at an electrode as claimed. Appellants argue that the two impedance probes of claim 11 produce new and unobvious results. Appellants argue that the examiner has failed to identify any impedance probe in Patrick [brief, pages 9-12].

The examiner responds that Patrick does teach measuring the impedance of a plasma chamber electrode. Although the examiner acknowledges that Patrick only teaches one impedance probe and not two impedance probes as claimed, the examiner finds the mere duplication of parts to be obvious citing In re Harza, 274 F.2d 669, 124 USPQ 378 (CCPA 1960). The examiner finds that the added process control from providing a second impedance monitor would naturally result and would have been obvious to the skilled artisan [answer, pages 5-8].

Appellants respond that even though Patrick teaches that the impedance of the plasma chamber electrode may be measured, Patrick fails to disclose even one impedance probe, not to

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mention a first impedance probe to measure the impedance at the HF electrode and a second impedance probe to measure the impedance at the LF electrode. Appellants also reiterate their position that measuring the impedance separately at the HF electrode and at the LF electrode produces new and unobvious results [reply brief, pages 1-3].

We will not sustain the examiner's rejection of independent claim 11 for essentially the reasons argued by appellants in the briefs. Claim 11 recites first and second impedance probes respectively coupled to the HF electrode and the LF electrode and a processor for adjusting processing conditions based on the measurements of the two impedance probes. The examiner acknowledges that Patrick teaches only one impedance probe, but the examiner essentially applies a per se rule that duplication of parts is not patentable. Although Patrick teaches a plasma chamber having two electrodes 112 and 114, the impedance measurement in Patrick is described as being used to control the impedance of the plasma chamber electrode [column 3, lines 63-67]. Patrick does not disclose how impedance is to be measured, and it is not apparent to us which electrode in Patrick is subject to the impedance measurement. Most importantly, the examiner has provided no convincing argument that separately

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measuring the impedance at the HF electrode and the LF electrode as claimed is nothing more than a mere duplication of parts. Since the two claimed electrodes are connected within the plasma chamber differently, it is not apparent how the claimed invention is nothing more than duplicating the teachings of the prior art with expected results. In our view, the examiner has simply failed to demonstrate that the claimed two impedance probes coupled in the claimed manner would have been obvious from the applied prior art.

Since we have not sustained the examiner's rejection of independent claim 11, we also do not sustain the rejection of dependent claims 3, 4, 6, 12-14, 19, 28 and 29. With respect to dependent claims 5, 23 and 27, although these claims are rejected using the additional teachings of Boys or Yamagata, neither Boys nor Yamagata overcomes the deficiencies in the basic combination of Arami and Patrick discussed above. Therefore, we also do not sustain the examiner's rejection of dependent claims 5, 23 and 27.

With respect to independent claims 16 and 20, the examiner essentially finds that Arami teaches the claimed invention except that Arami does not teach capacitors in the

matching networks. The examiner asserts that matching networks are well known in the art as having capacitors as demonstrated by Patrick. The examiner also observes that Patrick teaches variable capacitors and tuners of a matching network. The examiner finds that it would have been obvious to the artisan to use the teachings of Patrick with Arami [final rejection, pages 5-7; incorporated into answer at page 4].

With respect to independent claims 16 and 20, appellants argue that neither Arami nor Patrick teaches or suggests the matching network or variable capacitor as claimed. Appellants argue that the examiner has admitted that neither Patrick nor Arami teaches a variable capacitor separate from the matching network as claimed [brief, pages 15-17].

The examiner responds that Patrick teaches variable capacitors and tuners of a matching network wherein a processor adjusts a capacitance level of the variable capacitor to vary the impedance of the plasma [answer, page 5].

We will not sustain the examiner's rejection of independent claims 16 and 20. The examiner's rejection is premised on the obviousness of duplicating the Patrick impedance monitor and to couple an impedance monitor to each of the LF and HF electrodes of Arami. Such duplication (replication),

according to the examiner, would teach that the matching network of Arami would have capacitors that are different than the variable capacitor of Patrick [answer, page 10]. First, as noted above, we disagree with the examiner's premise that it would have been obvious to the artisan to provide a second impedance probe connected as claimed based on the teachings of Patrick. Second, we fail to see how providing a second impedance probe would have resulted in the matching network having capacitors different from the variable capacitor anyway. There is no evidence on this record that an impedance probe would require a capacitor different from the variable capacitors shown in the matching network of Patrick.

Since we have not sustained the examiner's rejection of independent claims 16 and 20, we also do not sustain the rejection of dependent claims 24, 26 and 30.

In summary, we have sustained the examiner's obviousness-type double patenting rejections on this record because appellants have not challenged the rejections. However, we have not sustained any of the examiner's prior art rejections. Therefore, the decision of the examiner rejecting claims 3-6, 11-14, 16, 19, 20, 23, 24 and 26-30 is affirmed.

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No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a)(1)(iv).

AFFIRMED

JAMES D. THOMAS
Administrative Patent Judge

Jerry Smith
JERRY SMITH
Administrative Patent Judge

Lee E. Barrett
LEE E. BARRETT
Administrative Patent Judge

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